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"Google and me together can read anything." Online reading strategies to develop hypertext comprehension in ESL readers

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Abstract

If we are to build in our students, literacy skills relevant for the 21st century, reading classrooms need to take into account the changing nature of texts that our students are required to read in real-world contexts (Alexander & The Disciplined Reading and Learning Research Laboratory, 2012). This paper exhorts ESL teachers to use online texts or hypertexts, in addition to print textbooks, in the reading classroom. The use of hypertexts can increase the literacy participation of students by making reading authentic, and ensuring literacy skills they acquire more meaningful and productive (Coiro, Killi, & Castek, 2017).

In the reading classroom where this research was located, it was observed that readers who scored low on reading comprehension tests based on print texts demonstrated higher levels of comprehension while performing on tests based on hypertexts. The study was conducted to identify the reading strategies used by these readers. It was found that ESL readers were able to overcome deficits in their prior knowledge (topic familiarity) and/or language proficiency by using specific reading and navigating strategies. This paper proposes that strategy training in the use of newer reading and navigating strategies might help develop online reading comprehension expertise and build independent reading habits in ESL readers.

Keywords: online literacy; online reading comprehension; reading strategies; navigating strategies; strategy training

1. Introduction

Information literacy and lifelong learning are essential for the development and prosperity of the modern Information Society (The Alexandria Proclamation, 2005). Information literacy goes beyond the traditionally upheld literacy skills, the 3 Rs of reading, writing, and arithmetic, to include the ability to find information; evaluate the credibility of information; combine information from multiple texts; think critically and solve problems using information gained; and create new information to achieve personal, professional, educational and social growth. Terming it a gate skill, UNESCO (2017)

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considers information literacy a basic human right that can ensure equal access to information and empowerment of all.

In the digital age, information literacy encompasses an individual's ability to employ information and communication technologies to find, understand, use, create, and share information online (Joynes, Rossignoli, & Fenyiwa Amonoo-Kuofi, 2019). An information literate individual is capable of performing literacy skills like searching the web for information; evaluating the relevance of information; assessing the reliability of information; retrieving and storing information; synthesizing from multiple sources; collaborating and interacting with others to construct information personally meaningfully ways; producing information using technology tools; and sharing it in multiple formats using the right tools on multiple platforms for different audiences (Horning, 2012). Information literacy is not a new skill; it is a combination of technical skills (to use the internet, understand web features, navigate through websites, etc.) and literacy skills (to read, interpret, think critically, solve problems, make informed decisions, communicate, etc.).

The paper works on the premise that in the current digital age when the preferred source of information for most is the world wide web, and a majority of reading resources are hypertexts, the development of online reading comprehension skills plays a significant role in the development of information literacy skills in our students. Secondly, students who spend most of their lives outside school hours connected to the internet via phones or other devices, find classes that ignore the world wide web disconnected from the real world. The use of online texts in our classrooms might increase the literacy participation of students and make literacy skills acquired more meaningful and productive (Coiro, 2011; Coiro, Killi, & Castek, 2017). Above all, the use of online texts in our classrooms can help create inclusive learning environments and develop autonomous reading habits in our learners (Wang, Kinzie, McGuire, & Pan, 2010). Online reading texts, unlike print textbooks, increase reader motivation by offering a wider variety of topics at various levels of reading difficulty. Online texts also scaffold the comprehension processes of struggling readers by providing language and background knowledge supports through hyperlinks. Further, their multimodality and the ease of access to information facilitate comprehension in students with diverse cognitive styles, language competencies, and levels of content knowledge, and from different socio-economic and cultural backgrounds.

1.1. Comprehension of online texts

Reading an online text that employs hyperlinks requires a reader to navigate among the various links, determine which ones to read, decide the order of reading them, and consolidate and use the information in the various links. In addition, the reader might also access the abundance of resources available on the world wide web to overcome obstacles in comprehension or out of curiosity. For instance, one can seek word meanings, background information, information in simpler language, additional information, translation of texts, information in multimedia formats, etc. using a simple search engine to support comprehension of online texts. While some argue that such reading could cause disorientation and cognitive overload in readers (DeStefano & LeFevre, 2007), online texts are also lauded for their tremendous potential to support the comprehension processes of readers (Cho, Woodward, & Li, 2018; Kazakoff, Macaruso, & Hook, 2018). The intense reader-text interaction that ensues due to reader activities like deciding which links to visit, charting a reading path through the links, constantly integrating information received from the various links, deciding when one has read enough, etc. is seen as an enabler of deep reading comprehension.

Since hypertexts can both obstruct and promote reading comprehension, it is essential to understand what differentiates a good reader from a poor reader of online texts. This paper seeks to

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identify reading strategies that can help readers utilize the enabling features of online texts and acquire successful comprehension of online texts.

1.2. Reading strategies

Reading comprehension strategies are techniques or mental operations employed by a reader to comprehend texts and construct meaning using text information (Kintsch, 1998). They are conscious or deliberate activities used by a reader to select, comprehend, and organize information in a text (Pressley & Harris, 2006) in order to meet specific reading goals (Afflerbach, Pearson, & Paris, 2008). Strategies can also be used to repair a reading component that is not adequate or circumvent a reading obstacle (Graesser, 2007).

Reading strategies are used in all stages of information acquisition, viz., to set a goal for reading, decode text content, understand word meaning, retrieve relevant information from prior knowledge, form connections between text information and prior knowledge, identify important aspects of the message, recognize comprehension obstacles, decide alternative strategies to overcome comprehension problems, construct meaning of the text, and store new information gained from the text (O'Malley & Chamot, 1990). Examples for reading strategies are previewing, predicting, setting a purpose for reading, selecting a suitable strategy, monitoring comprehension, summarising, reading multiple sources, activating prior knowledge, asking questions to oneself, using text-structure awareness, inferencing, etc. (Grabe, 2009; Blachowicz & Ogle, 2008).

Oxford (1990) classifies strategies into direct and indirect strategies. Direct strategies act upon the target language directly and contribute to language acquisition. Cognitive strategies, a group of direct strategies enable readers to assimilate text input by re-organizing and reconstructing text content by linking it with one's prior knowledge. Examples for cognitive reading strategies are (a) local or word-based strategies that help understand word meanings such as using linguistic clues to understand the nature of a word or using the context to guess the meaning of an unfamiliar word; and (b) global or knowledge-based strategies that facilitate an overall understanding of a text such as predicting or retrieving relevant schemata.

Indirect strategies, on the other hand, support or manage language learning without directly involving the target language. Metacognitive strategies are a group of indirect strategies that enable readers to monitor and plan comprehension to facilitate successful comprehension of a text. These strategies are also used to assess progress made in comprehending a text or to decide remedial action to bridge comprehension deficits if any.

Several researchers (Chamot, 2005; Taylor, Stevens, & Asher, 2006; Zhang, 2008; Cantrell & Carter, 2009; Li, 2010; Palincsar & Schutz, 2011; Oxford, 2016) have successfully proven that explicit strategy instruction, a type of strategy instruction where the teacher talks about the strategies one can use and demonstrates how and when to use them, is most effective in developing strategic reading competency and building independent reading habits in learners. Developing a list of successful reading comprehension strategies is the necessary first step for explicit strategy instruction (Pressley, 2000).

It is hoped that through the identification of strategies used by successful comprehenders of online texts, the study reported here will contribute to the development of more relevant and productive reading strategy instruction practices in our classrooms.

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2. Review of research in online reading strategies

Studies comparing reading online and print texts suggest that the ability to comprehend print texts can determine to a certain extent, one's ability to read online texts (Coiro, 2011). Proficient readers use the same comprehension strategies while reading hypertexts and printed texts, the most frequently used ones being activating prior knowledge, inferential reasoning, monitoring and repairing comprehension, asking purposeful and directed questions (Leu, Zawilinski, Forzani, & Timbrell, 2014), and determining important ideas (Huang, 2013).

Research also validates that due to the differences in text features, reading linked online texts demands skills and strategies that are different from those used for comprehending linear, print texts (Anderson, 2003; Leu, Zawilinski, Castek, Banerjee, Housand, Liu, et al., 2007; Coiro, 2011); online reading requires, in addition, a separate set of unique and complex strategies.

Anmarkrud, Brâten, & Stromso (2014) working with college-level readers reading in a controlled browsing environment (a set of pre-selected websites) found that students who used intertextual linking strategies, evaluation of sources, and comprehension monitoring demonstrated a better understanding of texts than students who did not use these strategies.

Goldman, Braasch, Wiley, Graesser, & Brodowinska's (2012) again working with college readers reading in a finite online reading environment reported that the use of strategies that helped information evaluation, navigation, intertextual linking, and comprehension monitoring was positively correlated with the deep reading comprehension of online texts.

Cho's (2014) research with competent readers seeking information in free browsing vs controlled browsing context observed that in addition to print reading strategies, readers used strategies to seek information, evaluate sources, and monitor one's comprehension. The study also noted that readers tend to use more information-locating strategies when required to perform free browsing, as compared to reading a limited number of pre-identified websites when they resorted to the use of strategies meant for text comprehension.

A study conducted by DeSchryver (2015) to list text-integrative and synthesis strategies used by adult readers identified that proficient readers were involved in a process of continuous construction of text information; as they located and visited new information sources, readers constantly revisited, modified, and reconstructed their mental representations of text information. Cho & Afflerbach (2015) also reported similar strategies employed by a highly-skilled, high school reader to explore, seek and retrieve information on the internet; determine its relevance vis-à-vis reading goals; select hyperlinks to visit that can contribute to meaning-making, and build a reading path to connect various information sources.

Hypertext researchers have also investigated closely readers' use of navigation strategies. These strategies are used by a reader to

- evaluate information sources
- determine which links to visit
- decide the right sequence of visiting sources
- perform continuous monitoring of comprehension
- prevent getting lost in the network of information
- assign coherence to text segments
- establish a structure to organize information accessed
- identify gaps in information gained

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- seek additional sources of information, and
- integrate information from multiple pages.

A closer look at the various navigating strategies used by readers to chart a reading order among hyperlinks was provided by Protopsaltis & Bouki (2005) who observed that in order to build coherent mental representations of text meaning, hypertext readers use three navigation patterns: visit all the links in a text in a linear order (linear navigating strategy); read contents of only certain links in a text (mixed navigating strategy), or view all the links available and then choose what one wants to read (mixed review navigating strategy).

Research reported above identifies reading strategies unique to online reading as inter-textual reading strategies that help intertextual linking and synthesizing of information resources; and navigation strategies that help hypertext readers navigate successfully through multiple websites. These strategies are indispensable for the successful comprehension of linked online texts (Afflerbach & Cho, 2010; Salmerón, Strømsø, Kammerer, Stadtler, & van den Broek, 2018).

As teachers, we must equip our students with these medium-specific strategies if we are to develop their online reading comprehension skills (Salmon, 2013; Broadbent & Poon, 2015). Working with learning strategies, Bannert, Hildebrand, & Mengelkamp (2009) established the efficacy of explicit instruction in enhancing the online learning experience of college students. They observed that students who received instruction in learning strategies like setting goals, making plans, judging information, monitoring, self-evaluating, etc. performed significantly better in their learning outcomes than students in the control group. Other studies by Dreyer & Nel (2003) and Hua & Lai (2010) have also reported the efficacy of teaching the use of medium-specific reading strategies in supporting readers' comprehension of technology-enabled reading texts.

3. The present study

Though several studies reported above list reading strategies used by successful readers, continuous documentation of effective reading strategies is essential due to the evolving nature of texts. "Literacy is rapidly and continuously changing as new technologies for information and communication repeatedly appear and new envisionments for exploiting these technologies are continuously crafted by users" (Leu, 2000, p. 743). Understanding the changing nature of reading comprehension will benefit comprehension instruction since the identification of newer strategies will make available a potential wider strategy repertoire to the reading teacher. Keeping in mind the deictic nature of literacy, this can ensure the currency and relevance of strategies taught in our classrooms.

Secondly, as was observed by this researcher, when reading is limited to a finite set of websites pre-determined by the teacher, readers tend to visit every link and read each link's content carefully. Navigation patterns of readers are better studied in authentic, free browsing hypertext reading environments. Thirdly, most research in hypertext reading has not attempted to understand the levels of comprehension achieved by the participants and therefore cannot explain if the use of specific strategies can lead to better comprehension. The study reported here attempts to address these concerns to some extent.

This paper presents insights drawn from observation of ESL users reading authentic texts on the web for information acquisition. In the ESL classroom where this research was located and where this researcher was the teacher, it was observed that all students demonstrated higher levels of comprehension while reading online texts when compared to reading print texts.

A research was conducted to (1) investigate the difference between ESL readers' comprehension of print and online texts, and (2) locate the reading strategies used by these students while reading print

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texts and hypertexts. The research was also expected to throw light on the differences, if any, in the use of reading strategies of high language proficiency and low language proficiency readers.

4. Method

4.1. Participants

Using purposive sampling, 40 students from a class of 79 undergraduate students were selected based on their level of English language proficiency. Based on the scores they received for their English language proficiency course in the previous semester, 20 students who scored between 75 to 91 marks were classified as high language proficiency group and 20 students who scored between 23 to 40 marks were considered as low language proficiency group for the study. All students were in the age group of 19 – 21. A brief questionnaire administered to establish their online reading expertise revealed that all students spent an average of three hours a day reading online texts. Students also reported 7 – 12 years' familiarity with surfing and browsing the internet and reading online.

Informed consent was sought from these 40 students to use the data collected for research purposes.

4.2. Instruments

All students were required to read eight texts – four in the print mode and four online texts. Of the four in each mode, two texts were on topics that were familiar to students and two were on unfamiliar topics. Familiarity of topics was determined at the beginning of the study by asking students to mark their degree of familiarity with 20 topics using a 5-point Likert scale.

Following Bereiter & Bird's (1985) suggestion, think-aloud was used to record students' comprehension processes in order to access their cognitive and metacognitive strategies. A list of reading strategies created by the researcher by collating strategies identified by Oxford (SILL, 1990) and those listed by Cho & Afflerbach (2017) was used to familiarise students with the concept of reading strategies.

After reading each text, students gave written responses to five comprehension questions that included factual, global, and inferential type questions.

4.3. Procedure

Data collection was conducted over a period of nine weeks. Before the beginning of the study, the researcher explained the concept of reading strategies and demonstrated the use of a few strategies like guessing word meaning, underlining, making connections among ideas, and inferring. A list of reading strategies collated by the researcher was then distributed among the students, following which other strategies were discussed, explained, and elaborated.

Next, the researcher demonstrated the think-aloud protocol using three texts. This was to show the students how to verbalize one's thought processes and also to illustrate the researcher's use of reading strategies. After this, the students were given time to practice the production of think-aloud using short and simple texts both in their L1 and in English.

The collection of data for the study commenced after this. Students were asked to read each text, record their think-aloud (in L1 or English), and answer comprehension questions. During this time, the researcher went around the class observing reader behaviors and recording significant insights gleaned on an observation log. Inputs obtained from informal conversations with students during and after class hours were also noted.

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4.4. Analysis

Each text was followed by five comprehension questions with two marks allotted for each question. Student responses to reading comprehension questions were scored and were considered as indicators of their comprehension performance.

Think-aloud protocols were transcribed (translated and transcribed by a native speaker if produced in L1) and coded to identify the reading strategies used by each student. These were then categorized into cognitive strategies and metacognitive strategies. Reading strategies listed by Oxford (SILL, 1990) and reading comprehension strategies used by digital readers (Cho & Afflerbach, 2017) were used to guide the categorization of strategies. Inputs from the researcher's observation logs were also referred to in order to interpret the results of the data analyzed.

5. Results and discussion

5.1. Analysis of students' comprehension scores

Table 1 presents mean comprehension scores of twenty high language proficiency (HL2) and twenty low language proficiency (LL2) readers reading two familiar and two unfamiliar texts each in print and online modes.

Table 1. Reading comprehension performance (Mean and SD) of HL2 and LL2 reading print and online texts

Text types	HL2 M (SD)	LL2 M (SD)
Print familiar	9 (0.5)	4 (0.7)
Print unfamiliar	6 (0.6)	2.7 (0.6)
Online familiar	9.6 (0.55)	6.2 (2.02)
Online unfamiliar	9 (0.6)	4.8 (1.67)

No. of students HL2 = 20

No. of students LL2 = 20

Score total for each text type = 10 marks

These results reveal the promise and potential of online texts. It is clear that both HL2 and LL2 readers found comprehension of online texts easier than that of print texts.

Mean scores of HL2 in online reading contexts are higher than in print reading contexts. Particularly significant is the fact that the reading comprehension scores of online texts on unfamiliar topics almost match the comprehension outcome of texts on familiar topics.

In the case of LL2 too, mean scores in online reading contexts are higher than that in print reading contexts. Several LL2 readers were also able to answer inferential and global questions accurately after reading hypertexts, an ability they did not demonstrate while reading print texts.

However, high SD values in LL2 online contexts denote that data is more spread out. A relook at individual scores shows that LL2 readers have a larger range of data – out of a total of 10 marks, LL2 readers scored 4 – 9 marks in online familiar and 3 – 7 marks in online unfamiliar texts. Simple sorting of the dataset in ascending order showed the presence of nine outliers who scored higher than the rest of the group.

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Table 2. Comparison of HL2 and LL2 readers reading online texts on familiar and unfamiliar topics

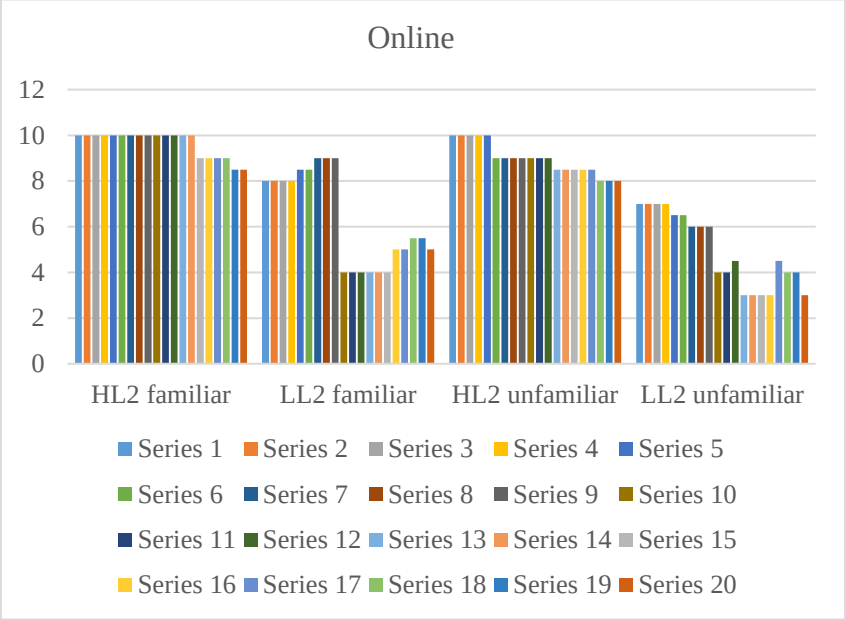

Table 2 shows the presence of nine LL2 outliers in online reading settings. (This is discussed in detail in a later section *5.2.3. Navigating strategies*.

5.2. Analysis of reading strategies used

Listed below are the reading strategies used by the HL2 and LL2 readers of this study while reading print and electronic texts. For ease of reference, strategies marked in **bold** are used by both HL2 and LL2, in *italics* are those used only by HL2, and those in normal are reading strategies used only by LL2 readers. Print and online reading strategies are placed side-by-side to denote a match of strategies whenever there is one perceived.

5.2.1. Cognitive strategies

Tables 3 and 4 list the local and global cognitive strategies used by the readers of this study.

Table 3. Cognitive strategies – local / word-based strategies

	PRINT READING STRATEGIES	ONLINE READING STRATEGIES
1	**Uses a dictionary**	**Uses an online dictionary**
2	**Translates the unfamiliar word**	**Uses a search engine and visits related websites**
3	*Uses context to guess word meaning*	**Uses multiple contexts to guess word meaning**
4	*Relates new words to a familiar root word and breaks into components*	**Translates sentences/ words to L1**
5	*Ignores the unfamiliar word and reads on*	
6	*Thinks of other words in English that sound like the new word*	
7	Pays close attention to the pronunciation of the word by reading it aloud	

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8	Translate the context and guess the meaning

Table 4. Cognitive strategies – global / knowledge-based strategies

	PRINT READING STRATEGIES	ONLINE READING STRATEGIES
1	**Uses prior knowledge to help understand**	**Uses prior knowledge to help understand**
2	**Adjusts reading speed according to the importance of information**	*Adjusts reading speed according to the importance of information*
3	**Paraphrases**	**Paraphrases**
4	**Identifies parts that are easy and difficult**	**Identifies parts that are easy and difficult**
5	*Previews; Skims and guesses text content using the title, headlines, etc.*	*Previews; Skims and guesses text content using the title, headlines, etc.*
6	**Tries to identify the main idea**	**Tries to identify the main idea**
7	**Translates to mother tongue**	**Translates to mother tongue**
8	*Uses typographical features like bold, italics, and other structure cues to identify text type and key information*	*Uses typographical features like bold, italics, and other structure cues to identify text type and key information*
9	*Asks questions to self and look for answers*	**Asks questions to self and look for answers**
10	*Makes a distinction between what to read closely and what to ignore*	**Makes a distinction between what to read closely and what to ignore**
11	*Makes inferences*	**Makes inferences**
12	*Makes predictions confirming or disconfirming inferences*	**Makes predictions confirming or disconfirming inferences**
13	*Scans a text for a specific piece of information*	**Scans a text for a specific piece of information**
14		**Searches for and uses visual and other multimedia representations to understand text content**
15		**Uses search engines to collect additional information to support text comprehension**
16	*Distinguishes between fact and opinion*	**Distinguishes between fact and opinion by visiting other sources**
17	*Evaluates the importance or trueness of what is written*	**Evaluates the importance or trueness of what is written looking at URL/addresses/ other information**
18	*Re-reads words and sentences multiple times*	**Re-reads once or twice at most, and then searches for another source**
19	Underlines, highlights, makes notes	**Copies and pastes sentences to an online notepad**
20		**Organizes text information in mind**
21	Integrates information in different parts of the text	**Integrates information from different parts of the same text and from other texts**
22		**Forms a mental picture of the layout of text content organization**
23		**Forms relation among link contents**
24		**Summarises link contents immediately before closing the page**

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25	**Does not open many links at a time**
26	**Inspects URL address for location of node contents**
27	**Classifies level of content in links and uses them accordingly**
28	**Hits back button frequently**

HL2 readers used more word-based strategies than LL2 in the print medium. However, while reading online, both sets of readers used similar strategies choosing to use online dictionaries or translators for finding meanings of unfamiliar words. It was also noticed that a few readers expressed preferences for consulting specific sources like dictionary.cambridge.org or merriam-webster.com for word meanings.

A second significant observation was regarding *using context to guess word meaning*, a strategy that was used only by HL2 readers when reading print texts. While reading online texts, it was noticed that several HL2 and LL2 readers used **multiple contexts to understand word meaning**. After consulting online dictionaries for word meanings, readers who felt they needed more information went on to search for and read longer texts that either explained the use of the word in a sentence or provided additional contexts where the word was used. Many readers thus were able to go beyond the acquisition of just word meanings to forming a richer understanding of the use of the word.

Accessing a variety and a number of web resources gave readers access to multiple contexts where the word was used and thus move beyond a decontextualized understanding of word meanings (as provided by dictionaries) or a limited explanation of the meaning of the word (the meaning of the word in relation to its immediate context as is provided in a hyperlink). By integrating information from additional sources, readers formed a rich network of meanings and developed a depth of vocabulary (Oakhill, 2019). In contrast to breadth of vocabulary (the number of words someone knows), depth of vocabulary means the quality of information one has about these words. In other words, vocabulary depth indicates a richer understanding of the word, its meaning, and its uses. Research with young readers reported by Oakhill & Cain (2012) points out that depth of vocabulary is predictive of reading comprehension ability and is a significant indicator of literacy development (Binder, Cote, Lee, Bessette, & Vu, 2017).

Table 4 shows that LL2 readers used more global strategies while reading online texts than when reading print texts. It is also clear that there is a good level of similarity in the strategies used by HL2 and LL2 while reading online texts. During classroom observations, it was noticed that strategies 1 to 13 were employed in online contexts due to the presence of links that prompted and facilitated intense interaction with online texts. For instance, many LL2 readers were able to predict, infer, recall relevant prior knowledge, ask questions, and paraphrase when they visited links in the text and/or additional sources of information on the internet.

Cognitive strategies 14 to 18 were strategies deployed by the readers due to the free browsing reading environment. Readers of this study made extensive use of additional resources on the web for various reasons including scaffolding their comprehension with simpler texts or multimodal sources of information; verifying the reliability of the information; or ascertaining the significance of new information visited for text comprehension. In addition to helping readers comprehend the original text better, reading additional resources also functioned like rich teacher talk (Hakuta, 2016) that has the potential to improve students' understanding of concepts. Consulting other websites to support their comprehension of the original text provided readers with related knowledge about the topic and helped them construct a better meaning of the content (Roskos, Christie, and Richgels 2003). The richness of

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topic knowledge gained helped readers develop not only grammatical and linguistic competence but a wider range of communicative competence.

A strategy that requires discussion *distinguishes between fact and opinion by visiting other sources* (strategy no. 16). Used in print contexts only by HL2 readers, in online contexts this strategy was successfully used by both HL2 and LL2 readers. It was observed that some students successfully determined the authenticity of the website by *looking at URL/addresses/ other information* (strategy no. 17). While a few looked for clues such as domain information (.com, .org, .gov.in, .edu, etc.) or information regarding the author of the website, other readers judged a website based on its layout and appearance. For instance, websites that used large, decorative fonts in bright colours, and showed personalized commercial advertisements were ignored and preference expressed for websites with features like site maps, accessibility options, webpage translators, few or no advertisements, website footers that share details like a contact address, location map, copyright, etc.

Another print reading strategy, *re-reading multiple times till comprehension was achieved* (strategy no. 18) appeared altered in online reading contexts – if a source was difficult to comprehend, instead of spending time re-reading it, readers simply chose to search for and move to other sources for easier information.

Cognitive strategies 19 to 24 are inter-textual strategies employed by the readers of this study. Successful readers of online texts were constantly collecting, collating, organizing, and summarising information to form connections among the various texts they visited while reading online. Readers resorted to making mental notes; copying and pasting parts of texts on a Notepad or Word document and frequently consulting and modifying them; clicking the back button; or checking history to revisit pages earlier visited, etc.

Cognitive strategies 25 to 28 are actions readers undertook to prevent disorientation while navigating multiple links. Many readers were careful about not opening too many pages at a time (as reader 9 remarked, “never click open more than 6 to 7 sites”). Good readers also kept a constant eye on the website or webpage address to determine the location of the text they were reading as well as to classify link contents. To get their bearings right, readers frequently consulted path names or parts of URL such as /about-us/, /help/, /library/ etc., and breadcrumbs (a navigation path that shows a user’s location in a website).

5.2.2. Metacognitive strategies

This section discusses the metacognitive strategies used by the readers of this study.

Table 5. Metacognitive strategies

	PRINT READING STRATEGIES	ONLINE READING STRATEGIES
1	*Monitors comprehension through self-questions*	**Monitors comprehension by self-checking with questions, revisiting mental summaries, clicking back and forth between webpages, searching for additional information, etc.**
2	**Gets back on track when distracted**	**Gets back on track when distracted**
3	**Knows what to do to remember information**	**Knows what to do to remember information**
4	*Decides how to overcome comprehension obstacles*	**Decides how to overcome comprehension obstacles**
5	*Sets goals for reading a text*	**Sets goals for reading a text**
6	*Plans how to read the text*	**Plans how to read the text**

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7	*Revises strategy use*	**Revises strategy use**
8	*Tolerates ambiguity; don't mind if every sentence and every word is not understood*	**Tolerates ambiguity; don't mind if every sentence and every word is not understood**
9		**Decides when one has read enough**

While HL2's use of metacognitive strategies remained almost the same in both print and online reading environments, it is clear LL2 readers used more metacognitive strategies when reading hypertexts. Classroom observation and informal interaction with students showed that it was the presence of links that seemed to facilitate closer interaction of readers with online texts. Reading online texts generated a lot of "inner talk" as reader 1 put it – online readers were constantly talking and asking questions to themselves to predict link contents, decide whether to visit them, determine how much one has understood, plan what kind of additional information to seek, and where to search for it, etc. This made the process of reading more deliberate and active, with many readers demonstrating better ability to plan their reading as well as identify and overcome comprehension obstacles.

5.2.3. Navigating strategies

Navigating strategies is a set of strategies exclusive to reading in online contexts; the presence of hyperlinks and the occurrence of texts as linked segments necessitate their use for successful comprehension. Use of navigating strategies entails determining which links to select in a hypertext (or which webpages to read); deciding the right sequence of visiting links, and not getting lost in the network of information.

Navigating strategies identified by Protopsaltis and Bouki (2005) viz., linear navigating strategy, mixed navigating strategy, and mixed review navigating strategy were used to classify the navigating strategies used by the readers of this study.

It was observed that the readers of this study used navigating strategies as pre-reading and while-reading techniques. Table 6 presents the navigating strategies identified in this study.

Table 6. Navigating strategies

PRE-READING	WHILE-READING
Link preview	Linear
Link review	**Mixed**

5.2.4. Pre-reading navigating strategies

It was observed that both HL2 and LL2 readers performed pre-reading activities like skimming and forming an overall idea of the topic of the text before reading the actual text content in detail. Two types of pre-reading navigating strategies were used:

Link preview: This navigating strategy involved readers trying to form an overall idea of the meaning of the text by looking at or paying attention to words and phrases linked. Readers mentioned two reasons for this – the salient nature of links (owing to underline and colour) and the readers' intuition that parts of texts linked could contain significant information. A link preview thus functioned like skimming a text or performing a preview of a text – readers took a quick look at all the links available and predicted the text content. During a link preview, links were rarely clicked and link contents were seldom read. Linked words or phrases that were unfamiliar were ignored. After the preview, the text was read from the beginning.

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In this study, both HL2 and LL2 readers used this navigating strategy while reading familiar and unfamiliar texts.

Link review: While performing a link preview, a few HL2 and LL2 readers read certain link contents carefully. This strategy is what is identified by this researcher as a link review navigating strategy.

While previewing a text, these readers attempted to evaluate the relevance of certain links by reading their contents. Two reasons for reading link contents were given – readers' unfamiliarity of the linked segment (or anchor, i.e., the word or phrase hyperlinked) and curiosity or personal interest. On a few occasions, reading link contents also led to consulting dictionaries or other sources of information on the internet. A link review thus resulted in not only activating relevant reader schemata but also providing readers exposure to additional information relevant for text comprehension.

5.2.5. While-reading navigating strategies

There were also some readers who chose to start reading a text without any pre-reading activity. These readers used two types of navigating strategies:

Linear: A linear navigating strategy is used when readers proceed to click all the links that they come across in a text in a linear fashion, i.e., they read all the links in the text, right from the beginning of the text. It was found that this was used by several LL2 readers while reading both familiar and unfamiliar texts, and by a few HL2 readers when reading unfamiliar texts.

Mixed: When using a mixed navigating strategy, the reader does not read all the links they encounter while reading. In other words, link contents are read not following their order of occurrence in the text; depending on what is considered essential or interesting, contents of only certain links are read. This strategy was most used by both HL2 and LL2 readers in this study while reading familiar texts.

While the efficacy of any one navigating strategy cannot be proven with the small amount of data collected, this researcher observed that the use of the pre-reading navigating strategy, link review guaranteed high levels of comprehension in the readers of this study. It was this strategy that was used by all the nine outliers in the LL2 group. These LL2 readers showed mean scores M = 8.4 and SD = 0.4 in online familiar texts and M = 6.6 and SD = 0.4 in online unfamiliar texts, while group scores for LL2 were M = 6.2 and SD = 2.02 in online familiar texts and M = 4.8 and SD = 1.67 in online unfamiliar texts (see *Table 1*). It is also noteworthy that the LL2 outliers' scores are almost comparable with the scores of HL2 readers in online contexts: M = 9.6 and SD = 0.55 in online familiar texts and M = 9 and SD = 0.6 in online unfamiliar texts (see *Table 1*).

The findings of the study are summarised below:

1. Regardless of the familiarity of the topic, both HL2 and LL2 readers achieved deep reading comprehension of hypertexts than print texts.

2. Reading strategies used by HL2 and LL2 readers in online reading environments are almost similar.

3. Compared to print texts, both HL2 and LL2 readers used fewer word-based reading strategies but more knowledge-based reading strategies when reading hypertexts.

4. LL2 readers used more knowledge-based cognitive strategies and metacognitive strategies while reading hypertexts than print texts.

5. LL2 readers who used a link review navigating strategy demonstrated better reading comprehension of hypertexts.

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6. Discussion

The primary contribution of this research is the identification of reading and navigating strategies used by the ESL readers of this study while reading online texts. The strategies identified seemed to help ESL readers of the study overcome their linguistic and topic knowledge deficits, and achieve high levels of comprehension of online texts. We are still not sure how the LL2 readers were able to use more reading strategies while reading online texts than when reading print texts. There are two possibilities: these LL2 users could have developed their reading abilities while reading digital texts and consequently used more reading strategies while reading online texts. Alternately, they could be good L1 readers with high levels of strategic competence in L1, and reading online texts must have provided them the comprehension aids to reach the threshold level of L2 linguistic competence and content knowledge that facilitated the transfer of their strategies from L1 to L2. However, the scope of this study does not provide answers to these.

Concerning navigating strategies, this study adds to the strategies identified by Protopsaltis and Bouki (2005). Pre-reading navigating strategies, especially the link review navigating strategy, seem to have a positive effect on the reading comprehension of the subjects of this study. However, due to the exploratory nature of this study, no claims can be made until further empirical studies are conducted. If confirmed, this could be a good value-addition to strategy training programmes that aim to develop online reading comprehension skills.

Good levels of hypertext comprehension could be a consequence of the presence of links that encouraged readers to establish high levels of interaction with texts. A typical reading behavior observed by this researcher was that the readers were involved in constant self-talk, asking questions to oneself, and metacognitive reflection, all of which helped reduce reading anxiety and aided self-improvement (Thomaes, Tjaarda, Brummelman & Sedikides, 2019). Several instances of affirmative reader conversations were recorded such as, “This word… I can find out” (reader 27); “…okay, it is not here, but it will be coming in another place” (reader 7); “I’m not getting this…not to worry, but I know I will be getting it…let’s look here then…” (reader 21).

Most readers found reading print texts “boring” and “too long and too plain” (reader 35). The absence of links or the “un-markedness of paper texts” (reader 6) i.e., the absence of underlines and colour highlights – usually blue – that signify linking, made print texts look “very blank and confusing” (reader 6), whereas links in online texts were considered as signifying important points (readers described links as “guiding points” (reader 6) and “ship anchors” (reader 27)) that required close reading.

Links also scaffolded comprehension in other ways. For readers who employed pre-reading navigating strategies (link preview and link review), linked words and phrases helped form a mental outline of text by linking text information with prior knowledge, identifying deficits in prior knowledge, seeking additional information, and inferring connections among topics. Linked words thus functioned as advance organizers (Ausubel, 1963) providing a roadmap for guiding text comprehension of these readers. Advance organizers are information made available to learners before presenting the actual material to be learned with the purpose of helping them understand the material and learn better. According to Ausubel (1963), advance organizers are not mere lesson summaries or outlines of text contents; they are characterized by high levels of abstraction and generality and they help in "explaining, integrating and interrelating the material they precede" (p. 81).

In this study, it was observed that reviewing a text with the help of linked words/ phrases or sentences helped readers exercise various cognitive activities such as inferring, guessing, predicting, synthesizing, and forming relations among text concepts and prior knowledge, before reading a text. Revisiting the same link contents while reading the text served the same effect as repetition of content

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as readers were able to construct a sketchy cognitive framework of text before reading the text and complete it while reading thus making comprehension easier.

7. Implications and conclusion

The study suggests that since ESL readers' online reading comprehension seems to be facilitated with the use of certain cognitive, metacognitive, and navigating strategies, providing explicit training in the use of these strategies might promote online literacy skills. An effective strategy training programme would not just train readers in the new medium-specific strategies required for effective online text comprehension, but also create awareness in readers of the potential of the internet to overcome reader deficits (like linguistic competence or topic familiarity) and scaffold comprehension. With the help of further research, this could provide a way to the development of lifelong learning habits in ESL readers.

Another significant observation made during the study is that reading in online environments might help learners build not only linguistic and content competence but also pragmatic and sociolinguistic competencies. Kasper (1997) points out that due to a narrow range of conversation topics, interaction opportunities, and language restraints, a typical teacher-fronted classroom is unable to provide L2 learners sufficient input to develop their pragmatic competence. This research points out that exposure to authentic language resources on the internet could be a way of not only building online reading literacy skills but also facilitating pragmatic competence in ESL readers.

Though further in-depth studies of longer duration with larger sample sizes and more reading texts are required to confirm the findings presented in this paper, this study can be perceived as a first step towards understanding the reading strategies used by ESL readers for utilizing the potential of online texts and the internet to overcome comprehension deficits and facilitate meaning making. For the ESL teacher, this paper provides insights into understanding how the use of online reading texts in the classroom can help develop information literacy and lifelong reading habits in our students. Like a reader joyously remarked, “Google and me together can read anything.”

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